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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,626	03/22/2005	Michel Langlet	FR 020103	3787
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EXAMINER				
HANOR, SERENA L				
ART UNIT		PAPER NUMBER		
4116				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/528,626

Applicant(s)

LANGLET ET AL.

Examiner

SERENA L. HANOR

Art Unit

4116

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 10-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 4-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CIS)
- Paper No(s)/Mail Date 02/23/2006

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election Acknowledged

Telephone Election

1. During a telephone conversation with Mr. Frank Keegan on 12/12/2007 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-16 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Election/Restrictions

2. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-9, drawn to a process for producing a stable solution containing anatase titanium oxide.

Group II, claim(s) 10, drawn to a stable solution containing anatase titanium oxide.

Group III, claim(s) 11-13, drawn to a process for coating a substrate with a photocatalytic and transparent layer.

Group IV, claim(s) 14-16, drawn to a substrate provided with a photocatalytic and transparent layer.

3. The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the process for coating a substrate with a photocatalytic and transparent layer and the product of said process, and a solution containing anatase titanium oxide are not novel over the prior art.

Unity exists only when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding claimed technical features. The express "special technical features" is defined as meaning those technical features that define a contribution which each of the inventions, considered as a whole, makes over the prior art." (Rule 13.2). The question of unity of invention has been reconsidered retroactively by the examiner in view of the search performed; a review of US 6,071,623 (hereafter US'623) and US 6,913,811 B2 (hereafter US'811) makes it clear that the claimed species of Groups III and IV are not novel over the prior art (the instantly claimed compounds). US'623 discloses a substrate coated at room temperature with multiple layers of an anatase titanium oxide and silica mixture (Claims 1-5, 8, 11, 16). US'811 discloses a photocatalytic member comprising a substrate, a plurality of thin-film photocatalytic layers consisting of titanium oxide with an anatase structure (Claim 29). Additionally, a review of US 5,897,958 (hereafter US'958) makes it clear that the claimed species of Group II is not novel of the prior art (the instantly claimed compounds). US'958 is draw to a modified titanium oxide sol containing anatase titanium oxide particles in a stable solution (col. 4, lines 34-53). Furthermore,

these references appear to demonstrate that the technical feature (i.e. a stable solution containing anatase titanium oxide) does not define a contribution which each of the inventions, considered as a whole, makes over the prior art. Thus, lack of unity becomes apparent "a posteriori" after taking the prior art into consideration. Accordingly, the prior art of the record supports restriction of the claimed subject matter in to the groups as mentioned immediately above.

Joint Inventors

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Status of Application

5. Claims 1-16 are pending and the elected claims 1-9 are presented for examination and the non-elected claims are withdrawn from consideration.

Claim Objections

6. Claims 4-9 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only and cannot depend from any other multiple claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1,167,296 A1 (hereafter EP'296) in view of US 5,593,737 (hereafter US'737).

The instant invention is drawn to a process for producing a stable solution containing anatase titanium oxide. An initial stabilized peptized solution including a titanium precursor material, an organic solvent, and an acid agent is prepared and then mixed with water to achieve a water to titanium molar ratio of greater than 0.8 and a pH less than 3 (Claim 1). This solution is heat treated at a temperature between 80-270C, dispersed, and then the water is exchanged with an organic solvent before it is dispersed to produce the final solution. The initial peptized solution is stabilized by aging at room temperature, wherein the molar ratio of water to titanium of less than 1 (Claims 2-3).

EP'296 is drawn to a method for producing an anatase type titanium dioxide coating material. A titanium precursor mixed with an organic solvent and an acid agent (col. 7 lines 51-58, col. 8 lines 1-13) is combined with a minor amount of water (col. 8 lines 17-21) and then heat treated at a temperature of 270C or less (col. 9 lines 1-5). The heat treated solution is then dispersed (col. 9 lines 27-35). Comparative Example A1 discloses a titania sol with a water to titanium molar ratio greater than 0.8 held at room temperature before being heat treated, if heat treated at all (col. 20 lines 13-20). Example B1 discloses mixing titanium isopropoxide and hydrogen peroxide and allowing it to hydrolyze and then adding more hydrogen peroxide and allowing it to stand and hydrolyze further (col. 22 lines 55-58, col. 23 lines 1-3). This mixture was then heat treated at 240C for 3 hours to produce a slurry (col. 23 lines 11-16).

EP'296 differs from the instant invention in that it does not disclose the pH of the intermediate solution before heat treating or the exchanging of water by an organic solvent to reduce the surface tension after dispersing the heat-treated intermediate solution. Furthermore, the molar ratio of water to titanium in the initial solution is not less than one. Finally, while there is a reference to holding the initial solution at room temperature (Comparative Example A1), there is no further disclosure as to how long the solution is held at room temperature, if this holding stabilizes the solution by aging it, or if the solution is then heat treated and ultimately dispersed.

US'737 is drawn to a photocatalytic semiconductor coating process. A photocatalytic semiconductor powder such as titanium dioxide is dispersed in sufficient water, hydrochloric acid is added to the mixture to attain a pH of about 2, and the

mixture is then sonicated (col. 3 lines 48-57). The surface tension of the final mixture can be reduced by the addition of alcohol.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify EP'296 by experimenting with different combinations of the process steps disclosed and to further modify EP'296 in view of US'737. For example, Comparative Example A1 of EP'296 is held at room temperature. Routine optimization would lead to the determination of the length of time at which it should be held at room temperature and then include further processing steps such as those disclosed in Example A1 such as heat treating. Further optimization would lead to controlling the water to titanium ratio of the initial solution to less than 1 in order to further stabilize the solution. Additionally, the modification of EP'296 in view of US'737 to add sufficient acid to maintain the pH of the intermediate solution at less than 3 would have been obvious given that the acid further inhibits the agglomeration of the photocatalytic particles in the mixture and increases the homogenous suspension time of the particles (US'737, col. 3 lines 20-27). A final modification of EP'296 in view of US'737 to add alcohol to the mixture after it is heated and dispersed in order to reduce the surface tension of said mixture would have been obvious given that this would improve the wettability characteristics of the mixture.

Conclusion

9. Claims 1-16 have been restricted, and Invention I, Claims 1-9, has been elected with traverse.
10. Claims 1-3 have been rejected.

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11. Claims 4-9 have not been treated on the merits given their improper multiple dependencies.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SERENA L. HANOR whose telephone number is (571)270-3593. The examiner can normally be reached on Monday - Thursday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SLH

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4116